

WHAT IS CLAIMED IS:

1. A system for thinning a layer on a substrate without damaging a delicate underlying layer in the substrate, the system comprising:
means for mechanically eroding the layer on the substrate, and
means for electropolishing the layer on the substrate.
2. The system of claim 1, wherein the means for mechanically eroding the layer and the means for electropolishing the layer are configured to operate simultaneously.
3. The system of claim 1, wherein the means for mechanically eroding the layer comprise a rotating polishing pad.
4. The system of claim 1, wherein the means for mechanically eroding the layer comprise a rotating brush.
5. The system of claim 1, wherein the means for mechanically eroding the layer comprise a spray nozzle adapted to direct a spray of a solution towards the layer.
6. The system of claim 1, wherein the means for mechanically eroding the layer comprise a rotating polishing pad, a rotating brush, and a spray nozzle adapted to direct a spray of a solution towards the layer.
7. The system of claim 1, wherein the means for electropolishing the layer comprise means for establishing a voltage potential through an electrically conductive liquid between the layer on the substrate and the means for mechanically eroding the layer.
8. A system for thinning a layer on a substrate without damaging a delicate underlying layer in the substrate, the system comprising:
an electropolishing pad for mechanically eroding the layer on the substrate, and
a power supply adapted to establish a voltage potential through a bath of an electrically conductive liquid between the layer on the substrate and the electropolishing pad.

9. The system of claim 8, wherein the voltage potential has a range of between about one tenth of one volt and about one hundred volts.
10. The system of claim 8, further comprising a brush for mechanically eroding the layer on the substrate, and a spray nozzle adapted to direct a spray of the electrically conductive liquid towards the layer.
11. A method for thinning a layer on a substrate without damaging a delicate underlying layer in the substrate, the method comprising the steps of: mechanically eroding a first portion of the layer, and electropolishing a second portion of the layer.
12. The method of claim 11, wherein the first portion of the layer comprises an overlying oxidized portion of the layer.
13. The method of claim 11, wherein the first portion of the layer comprises an underlying portion of the layer that is formed of a material that cannot be removed by electropolishing.
14. The method of claim 11, wherein the first portion of the layer comprises an overlying oxidized portion of the layer and an underlying portion of the layer that is formed of a material that cannot be removed by electropolishing.
15. The method of claim 11, wherein the second portion of the layer comprises a metal.
16. The method of claim 11, wherein the first portion of the layer is electropolished simultaneously with the mechanical erosion.
17. The method of claim 11, wherein the second portion of the layer is mechanically eroded simultaneously with the electropolishing.

18. The method of claim 11, wherein the layer comprises a first electrically conductive layer, an underlying non electrically conductive barrier layer, and an intervening electrically conductive seed layer.
19. The method of claim 11, wherein the layer comprises copper.
20. The method of claim 11, wherein the first portion of the layer is thinned to a relatively greater extent by mechanical erosion and is thinned to a relatively lesser extent by electropolishing, and the second portion of the layer is thinned to a relatively greater extent by electropolishing and is thinned to a relatively lesser extent by mechanical erosion.